Department of Energy
Oak Ridge Operations
P.O. Box E
Oak Ridge, Tennessee 37830

August 21, 1979

U. S. Department of Labor
Occupational Safety and Health
Standards
ATTN: Dr. F. B. Hanna
Office of Carcinogen Standards
Room N-3718
200 Constitution Avenue, N.W.
Washington, D. C. 20210

Gentlemen:

STUDIES RELATED TO THE SIGNIFICANCE OF WELDING FUME EXPOSURES

Please find six enclosures provided in response to your verbal request regarding the availability of studies, conducted at ORO facilities, related to the subject above. This material is provided in keeping with our verbal agreement to make information of this type available to those with an interest in DOE/ORO activities in the health protection areas. The information presented was compiled by the ORGDP Industrial Hygiene Department to provide assistance and guidance of an informative nature in regard to the subject matter covered. Much of the data is preliminary in content and may or may not be fully representative of all working conditions. Therefore, citations of data contained in this report should be allowed only with the written consent of the ORGDP Industrial Hygiene Department.

Enclosure one, entitled "Welders' Study," is a summary of the current status of the ongoing epidemiological study of welders employed in the UCC-ND Oak Ridge facilities. It is anticipated that this study will be completed by the end of this calendar year and will be submitted for publication in detail in a recognized journal. Enclosure two, entitled "Interpretation of Three-Plant Industrial Hygiene Field Monitoring Data and Subsequent Control Recommendations," provides a good summary of current levels of airborne metals observed in welding, cutting, and grinding operations at the three U. S. gaseous diffusion plants. Since

this summary was prepared for an engineering feasibility study, the subject matter was handled in very broad and general terms and, therefore, is not representative of all working conditions. Enclosure three, entitled "Summary of Airborne Nickel and Iron Levels in ORGDP Maintenance Facilities," presents routine personnel monitoring data for the periods and operations identified.

Enclosures four and five are preliminary drafts of studies which will be submitted for publication within the next twelve months. Their titles, "A Detailed Characterization of Metallic Fumes Generated During Metal Inert Gas (MIG) Welding of Nickel Plated Steel" and "A Study of Potential Personnel Exposures to Nickel and Iron Oxides During Welding Operations at the Oak Ridge Gaseous Diffusion Plant" adequately describe the contents. Again, since these studies are to be published, formal citations of the reports or their contents should not be made at this time.

Enclosure six is a preliminary draft of a study on the "Distribution and Elimination of Four Nickel Compounds Administered Intratracheally to Rats" conducted at the ORNL Biology Division. This information is provided for your general awareness only as additional work is necessary before the data presented can be properly interpreted.

If further assistance is necessary, please do not hesitate to contact Mr. G. L. Love of my staff at FTS 626-0854.

Sincerely,

William A. Pryor/for

Wiley A. Johnson, Chief
Health Protection Branch
Safety & Environmental Control Division

MS-334:GLL

Enclosures:
As stated

January 17, 1979

Docket Officer
Docket H-110
Room S6212
U. S. Department of
Labor - OSHA
Third Street and Constitution
Avenue, N.W.
Washington, D. C. 20210

Gentlemen:

OCCUPATIONAL EXPOSURE TO INORGANIC NICKEL: COMMENTS AND INFORMATION

Reference is made to the Request for Comments and Information, 42 Federal Register 49472, September 27, 1977, and our letter dated October 27, 1977, transmitting comments prepared by Union Carbide Corporation - Nuclear Division (UCC-ND), contractor to U. S. Department of Energy (DOE).

Enclosed are copies of "A Long-Term Mortality Study of Workers Occupationally Exposed to Metallic Nickel at the Oak Ridge Gaseous Diffusion Plant." This study was prepared by Oak Ridge Associated Universities (also under contract to DOE) in cooperation with UCC-ND, and INCO, United States, Inc. The toxicology study described in the UCC-ND comments, transmitted in October 1977, is now underway and should be completed in 1979. In our continuing effort to obtain additional information which will help us protect DOE and contractor employees from harmful exposures to these materials, an epidemiological study on welders exposed to nickel materials at the DOE plants operated by UCC-ND in Oak Ridge has also been initiated, and will be made available as soon as it is completed.

CONCURRENCES
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMB
INITIALS/
DATE

9803.4.3

We hope that the enclosed report and results of our other studies, when available, will assist in DOL-OSHA's efforts to establish an appropriate standard for inorganic nickel and its compounds.

Sincerely,

[redacted]

R. J. Hart
Manager

MS-334

Enclosure:
As stated

cc w/encl:
W. J. McCool, DOES, HQ
W. R. Voigt, URE, HQ,
Stewart Warner, INCO
Richard DeWitt, INC

MS-334:GLLove:hv:6-0854:1-12-79

bcc w/o encl:
MS-30, C. A. Keller
EO-22, H. D. Fletcher
ER-10, J. A. Lenhard
Clarence C. Lushbaugh, ORAU
Stanley S. Stief, ORGDP
R. F. Hibbs, UCC-ND

OFFICE	MS-334	MS-33 S&EC	EO-22 (EOD)	ER-10 AMER&D	MS-30 AMM&S	M-1 Mgr.
SURNAME	Love/hv	T	[signature]	[signature]	[signature]	
DATE	1/12/79	1/12/79	1/12/79	1-16	1/17/79	

Form ERDA-318 (9-76) ERDAM 0240

January 17, 1979

Docket Officer
Docket H-110
Room S6212
U. S. Department of
Labor - OSHA
Third Street and Constitution
Avenue, N.W.
Washington, D. C. 20210

Gentlemen:

OCCUPATIONAL EXPOSURE TO INORGANIC NICKEL: COMMENTS AND INFORMATION

Reference is made to the Request for Comments and Information, 42 Federal Register 49472, September 27, 1977, and our letter dated October 27, 1977, transmitting comments prepared by Union Carbide Corporation - Nuclear Division (UCC-ND), contractor to U. S. Department of Energy (DOE).

Enclosed are copies of "A Long-Term Mortality Study of Workers Occupationally Exposed to Metallic Nickel at the Oak Ridge Gaseous Diffusion Plant." This study was prepared by Oak Ridge Associated Universities (also under contract to DOE) in cooperation with UCC-ND, and INCO, United States, Inc. The toxicology study described in the UCC-ND comments, transmitted in October 1977, is now underway and should be completed in 1979. In our continuing effort to obtain additional information which will help us protect DOE and contractor employees from harmful exposures to these materials, an epidemiological study on welders exposed to nickel materials at the DOE plants operated by UCC-ND in Oak Ridge has also been initiated, and will be made available as soon as it is completed.

We hope that the enclosed report and results of our other studies, when available, will assist in DOL-OSHA's efforts to establish an appropriate standard for inorganic nickel and its compounds.

Sincerely,

for Charles A. Keller
R. J. Hart
Manager

MS-334

Enclosure:
As stated

cc w/encl:
W. J. McCool, DOES, HQ
W. R. Voigt, URE, HQ
Stewart Warner, INCO
Richard DeWitt, INC

October, 1978

Executive Summary

A LONG-TERM MORTALITY STUDY OF WORKERS OCCUPATIONALLY EXPOSED TO METALLIC NICKEL AT THE OAK RIDGE GASEOUS DIFFUSION PLANT

This study was undertaken to determine whether mortality from respiratory cancer among workers occupationally exposed to airborne metallic nickel at the Oak Ridge Gaseous Diffusion Plant (ORGDP) differed from that of workers at the same plant with no record of occupational exposure to metallic nickel or any nickel compound. Two cohorts were identified; one of 814 nickel-exposed workers and a 1,600-worker control group. Both groups were employed at ORGDP prior to 1954 and data were collected through 1973. The members of both cohorts, therefore, had a minimum follow-up of 19 years. Mortality from respiratory cancer and from other causes was examined in both groups and the data indicated no discernible adverse effect on the nickel workers as compared to the control group.

Previous studies on other nickel compounds, such as impure nickel sulfide (Ni_3S_2), showed significantly increased incidence of cancer of the lung and of the nasal cavities. In the present study, no increased incidence rates of these types of cancer were found in workers exposed to the airborne metallic nickel in the barrier manufacturing operation. This suggests that the proposal by NIOSH to use the generic approach to establish nickel exposure standards is not valid, but rather, that the occupational standards for metallic nickel and its compounds should be considered separately.

During the period from 1948 to 1963, the median nickel concentration for 3,044 routine air samples was 0.13 mg/cu m. In retrospect, evaluation of the air monitoring data reported at that time indicates that the data may be biased toward the low side and the workers probably were exposed to higher concentrations. Current levels of nickel concentrations--under considerably improved work conditions and well within present standards--are higher than the historical data.

The results of the study have failed to demonstrate that airborne metallic nickel is a carcinogen in humans. Although the workers employed in the barrier plant had substantial exposures to airborne metallic nickel, they have experienced no increased risk of developing malignancies of the respiratory system. They actually had fewer deaths from this cause than expected. If airborne metallic nickel is a carcinogen, very high exposures for a long period of time must be required to trigger the malignant process.